

ACCESSION #: 9611260190

LICENSEE EVENT REPORT (LER)

FACILITY NAME: North Anna Power Station Unit 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000338

TITLE: AUTOMATIC REACTOR TRIP DUE TO FAILURE OF A GENERATOR
NEGATIVE PHASE SEQUENCE RELAY

EVENT DATE: 10/24/96 LER #: 96-010-00 REPORT DATE: 11/19/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Mr. W.R. Matthews TELEPHONE: (540) 894-2101

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: EL COMPONENT: 46 MANUFACTURER: G080

REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On October 24, 1996, at 0319 hours, Unit 1 experienced an automatic reactor trip from 100 percent power. The reactor trip initiating signal was "Turbine Trip/Reactor Trip" resulting from a main generator trip. Emergency procedures were entered and immediate actions were performed. All engineered safety feature (ESF) equipment responded as designed. The main generator trip was caused by the generator backup lockout relay (86-BU). Operation of the generator negative phase sequence relay actuated 86-BU. A non-emergency four hour report was made to the NRC at 0500 hours pursuant to 10 CFR 50.72 (b)(2)(ii). This event is reportable pursuant to 10CFR50.73 (a)(2)(iv).

The cause of the reactor trip is believed to be an internal problem to the generator negative phase sequence relay while operating in response to a transmission line fault.

No significant safety implications resulted from the reactor trip because the reactor protection safety systems responded as designed. Therefore, the health and safety of the public were not affected at any time during this event.

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1.0 Description of the Event

On October 24, 1996, Unit 1 was operating at steady state conditions at 100 percent power. All primary system parameters were normal for full power operation. No major maintenance or testing activities were in progress. At 0302 hours, an "A phase to ground" transmission fault occurred on the 230KV line in eastern North Carolina. The fault produced a momentary increase of negative sequence current of approximately 1 percent at the generator (EIIS System - TB, Component- TG). This increase, coupled with an internal problem in the generator negative phase sequence (SGC) relay (EIIS System-EL, Component 46) filter circuitry equaled the SGC trip setting. The increase was enough to start the max trip timer function for the SGC relay which is set at 16.5 minutes. The line fault cleared, however, the relay internal problem prevented the negative sequence current from dropping below the reset value, the trip element did not reset and continued to time. At 0319 hours, a trip output was produced tripping the generator backup lockout relay (86-BU) which in turn tripped the main generator. As a result, Unit 1 experienced an automatic reactor (EIIS System- AC, Component- RCT)

trip. The reactor trip initiating signal was "Turbine Trip/Reactor Trip" resulting from the main generator trip.

The SGC relay is set to trip at a 6 percent negative sequence current.

Testing of the relay identified a drift in the internal calibration of certain circuits in the SGC relay. The drift created approximately a 4.7 percent negative sequence input to the SGC relay with no signal present.

The transmission fault caused a negative sequence current of approximately 1 percent. This, in conjunction with the calibration drift of 4.7 percent equaled the trip setpoint of 6 percent and started the trip timer function of the SGC relay.

Preventive Maintenance was performed on the SGC relay in February 1996 with satisfactory results. Since then there have been several faults on the 500KV system and the SGC relay did not trip.

2.0 Significant Safety Consequences and Implications

This event posed no significant safety implications because reactor protection safety and engineered safety systems responded as designed following the reactor trip. Therefore, the health and safety of the public were not affected at any time during this event.

A non-emergency four hour report was made to the NRC at 0500 hours pursuant to 10 CFR 50.72 (b)(2)(ii). This event is reportable pursuant to 10CFR50.73(a)(2)(iv) for a condition that resulted in an automatic actuation of any ESF, including the reactor protection system.

3.0 Cause of the Event

The turbine and reactor trip was a result of a main generator trip. The main generator trip was caused by the generator backup lockout relay (86-BU) turbine trip. Operation of the SGC relay actuated the 86-BU lockout relay.

The cause of the calibration drift is being investigated. The SGC relay has been sent to the manufacturer for evaluation.

4.0 Immediate Corrective Actions

Following the reactor trip emergency procedure E-0, Reactor trip or Safety Injection, was entered and immediate actions performed. The post trip response progressed as expected and within approximately ten minutes the operators transitioned to 1-ES-0.1, Reactor Trip Response.

Initially, reactor coolant system (RCS) pressure and temperature decreased to approximately 1950 psig and 545 degrees F, respectively. Pressurizer level decreased to 25 percent. Subsequently, RCS pressure/temperature and pressurizer level returned to their normal values.

5.0 Additional Corrective Actions

The SGC relay and as found test results were shipped to the manufacturer for further evaluation . A root cause evaluation is in progress on the SGC relay.

6.0 Actions to Prevent Recurrence

Following completion of the root cause evaluation any inspections, tests

or service advisories recommended by the manufacturer will be implemented as required.

7.0 Similar Events

Unit 2 experienced two turbine / reactor trips as a result of main generator trips and were reported in the following LERs:

N2-86-008-00 The main generator trip was caused by the actuation of a generator differential lockout relay upon loss of excitation field signal.

N2-93-002-00 The main generator trip was caused by overexcitation.

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8.0 Additional Information

Component malfunctions resulting from the reactor trip include: feedwater regulating valve (1-FW-FCV-1498) (EIS System- SJ, Component-FCV) leaked through until isolated, intermediate range NI-35 (EIS System-IG, Component-DET) was under compensated, feedwater heater relief valve (1-SV-RV-115B) (EIS System-SJ, Component-RV) lifted and required isolation of the feedwater heater before resetting, and both low pressure heater drain auxiliary oil pumps (EIS System-SM, Component-P) tripped. Subsequent actions include: work request initiated for 1-FW-FCV-1498 and will be worked when plant conditions permit, compensation voltage for intermediate range N35 was adjusted, 1-SV-RV-115B is being evaluated by Engineering, and both low pressure heater drain auxiliary oil pumps were returned to service. A modification to correct the cause of the low

pressure heater drain auxiliary oil pumps is scheduled to be implemented during the next Unit 1 refueling outage.

Unit 2 was in Mode 3, hot standby, returning to power operations following a manual unit shutdown to repair a steam line and was not affected by the event.

Component Information:

Description: Negative Phase Sequence Relay

Manufacturer: General Electric

Model: SGC21B1A Rev. C

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Virginia Electric and Power Company

North Anna Power Station

P. O. Box 402

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November 19, 1996

U. S. Nuclear Regulatory Commission NAPS: MPW

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Dear Sirs:

Pursuant to North Anna Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to North Anna Unit 1.

Report No. 50-338/96-010-00

This Report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

W. R. Matthews

Station Manager

Enclosure:

cc: U.S. Nuclear Regulatory Commission

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R. D. McWhorter

NRC Senior Resident Inspector

North Anna Power Station

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